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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO.      |
|---|-------------|----------------------|---------------------|-----------------------|
| 10/631,870  | 08/01/2003  | Grigoriy Grinberg    | CS-21337            | 6351                  |
| 27182   | 7590        | 10/19/2004           | EXAMINER            |                       |
| PRAXAIR, INC.<br>LAW DEPARTMENT - M1 557<br>39 OLD RIDGEBURY ROAD<br>DANBURY, CT 06810-5113 |             |                      |                     | BAREFORD, KATHERINE A |
| ART UNIT  |             | PAPER NUMBER         |                     |                       |
|   |             | 1762                 |                     |                       |

DATE MAILED: 10/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                                   |                     |
|------------------------------|-----------------------------------|---------------------|
| <b>Office Action Summary</b> | <b>Application No.</b>            | <b>Applicant(s)</b> |
|                              | 10/631,870                        | GRINBERG ET AL.     |
|                              | Examiner<br>Katherine A. Bareford | Art Unit<br>1762    |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) This action is **FINAL**.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 10 and 11 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-9 and 12-20 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 01 August 2003 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date 8/03.
- 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-9 and 12-20, drawn to a method of coating, classified in class 427, subclass 456.
  - II. Claims 10-11, drawn to a product, classified in class 428, subclass 544+.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process, such as applying the "thermal spray material" by casting or vapor deposition.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
4. During a telephone conversation with Mr. G. Coon on October 14, 2004 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-9 and 12-20.

Affirmation of this election must be made by applicant in replying to this Office action. Claims 10-11 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

*Drawings*

6. The drawings are objected to because (1) an element is referred to ~~as~~ "1" but no description of this element is given in the specification. (2) the lead line of element 6 appears to end in the area of the element labeled as "1". Should the lead line be directed elsewhere? (3) the lead line of elements 4 and 2 appear to be directed to the same element of the article. Should one lead line be directed elsewhere?

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be

removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

#### *Specification*

7. The disclosure is objected to because of the following informalities: (1) at page 6, in the section of the "Brief Description of the Drawings", the statement "The spray metal thickness for printing rolls can preferably be from .0001 to 1.0 inch." should be moved to the "Description of the Preferred Embodiment". (2) at page 7, first paragraph "metal 8" is referred to. However, no element 8 is shown on the Drawing. (3) at page 7, first paragraph, a bondcoat 6 and metal 8<sub>A</sub> *are referred to.* However, it is unclear from a reading of the paragraph when the bondcoat is being referred to and when the metal layer 8 is being referred to in regard to the described thicknesses, etc. Note that the second paragraph on page 7 describes the optional applying of the bond layer, also making it confusing as to what is referred to in the paragraph above.

Appropriate correction is required.

*Claim Objections*

8. Claims 1-3, 6, 14, 16 and 18 are objected to because of the following informalities: (1) claim 1, line 9, "lesat" should be "least". (2) claims 2, 3, 6, 14 and 18, all use the phrase "selected from the group comprising". This is improper Markush group format, since "comprising" should be "consisting". Otherwise, the group is not actually limited to the materials listed, since other materials could be present as "comprising" is an open ended term. (3) claim 16, line 2, the comma after "acetate" should be deleted for proper grammar.

Appropriate correction is required.

*Claim Rejections - 35 USC § 112*

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 1-9 and 12-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, lines 2-4, requires "a substrate having a distortion temperature below the temperature of the thermal spray material at the surface of the substrate". Then at lines 11-14, it is required that "said thermal spray material having a temperature at the surface of the adhesive promoter coated substrate below the temperature at which the substrate would distort." The lines at 11-14 are contradictory to the lines at 2-4, because from line 11-14 it is clear that the coating

is not applied to the substrate and also is applied so as to have a different temperature than that described at lines 2-4. Thus, it is unclear what is really required by the claim.

Claim 11, lines 10-16, the claim requires applying the thermal spray material, but does not specify that the application is by thermal spraying, which is confusing as to what is actually required as to the application method.

The other dependent claims do not cure the defects from which they depend.

*Claim Rejections - 35 USC § 103*

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 1 and 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imao et al (US 4704328) in view of Fiber Reinforced Plastic Components with High-Abrasion Resistant Spray-Coatings Article (hereinafter Fiber Article).

Imao teaches a method for applying high melting point material onto a substrate by thermal spraying. Column 2, lines 10-20. The substrate can have a distortion temperature below the melting temperature of the thermal spray material (note the confusion as described in paragraph 10 above as to what is actually required). Column 3, lines 35-60. A substrate is provided with a contour of desired shape. See column 3, lines 60-65. The substrate can be a resin or fiber reinforced resin composite. See column 3, lines 40-60. An adhesive promoter layer is applied to the substrate. Column 3, line 60 through column 4, line 20. The thermal spray material is applied to the adhesive promoter layer by thermal spraying. Column 4, lines 10-30.

Claim 3: the adhesive promoter can be epoxy, polyvinyl acetate or a urethane. See column 3, lines 5-15.

Claim 4: the thickness of the promoter can be 100 microns, for example, approximately 0.004 inches. See column 10, lines 10-20.

Imao teaches all the features of these claims except controlling the temperature of the thermal spray material so it is applied to the adhesion promoter layer at a temperature below that which would distort the substrate material.

However, Fiber Article teaches that when applying thermal spray coatings to fiber reinforced plastic composites it is desirable to use multilayer bonding systems and to control the temperature of the substrate composite by extensive cooling of the substrate during the spraying process to below 150 degrees C so that the substrate is not damaged. See page 668, column 1.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Imao to cool the substrate during thermal spraying so that the applied thermal spray material will in turn be cool enough to prevent distortion of the substrate as suggested by Fiber Article so as to provide an undamaged article, because Imao teaches applying coatings by thermal spraying to an adhesion layer of a fiber reinforced composite, and Fiber Article teaches that when applying coatings by thermal spraying to an adhesion/bonding layer of a fiber reinforced composite, it is desirable to keep the substrate cooled to a point to prevent damage to the composite.

14. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamamura et al (US 4704328) in view of Fiber Reinforced Plastic Components with High-Abrasion Resistant Spray-Coatings Article (hereinafter Fiber Article).

Hamamura teaches a method for applying high melting point material onto a substrate by thermal spraying. Column 2, lines 5-15. The substrate can have a distortion temperature below the melting temperature of the thermal spray material (note the confusion as described in paragraph 10 above as to what is actually required). Column 3, lines 25-40 (note the materials). A substrate is provided with a contour of desired shape. See column 9, lines 35-45, for example. An adhesive promoter layer is applied to the substrate. Column 3, lines 5-10 and column 4, lines 65-69. The thermal spray material is applied to the adhesive promoter layer by thermal spraying. Column 5, line 65 through column 6, line 5. To prevent damage to the resin composition,

Hamamura teaches spraying at a relatively low temperature to prevent the resin in the adhesion promoter layer from being completely burned out. Column 6, lines 10-30.

Claim 2: the thermal spray material can be metal, such as aluminum. Column 6, lines 5-10.

Claim 3: the adhesive promoter can be epoxy, vinyl or a urethane. See column 4, lines 25-50.

Claim 4: the promoter can be applied at an amount of 40 g/m<sup>2</sup>, giving a thickness with the claimed range. See column 9, lines 35-45 (note the surface roughness, also).

Claim 5: the thickness of the metal can be 50 microns, or approximately .002 inch, for example. Column 9, lines 35-45.

Claim 6: the substrate can be plastic or wood. Column 3, lines 25-40.

Hamamura teaches all the features of these claims except controlling the temperature of the thermal spray material so it is applied to the adhesion promoter layer at a temperature below that which would distort the substrate material.

However, Fiber Article teaches that when applying thermal spray coatings to fiber reinforced plastic composites it is desirable to use multilayer bonding systems and to control the temperature of the substrate composite by extensive cooling of the substrate during the spraying process to below 150 degrees C so that the substrate is not damaged. See page 668, column 1.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Hamamura to cool the substrate during thermal spraying so that the applied thermal spray material will in turn be cool enough to prevent distortion of the substrate as

suggested by Fiber Article so as to provide an undamaged article, because Hamamura teaches applying coatings by thermal spraying to an adhesion layer of a resin substrate and that the spraying must be cool to prevent too much damage to the adhesion layer, and Fiber Article teaches that when applying coatings by thermal spraying to an adhesion/bonding layer of a fiber reinforced plastic composite, it is desirable to keep the substrate cooled to a point to prevent damage to the composite as well.

15. Claims 7-9, 15-16 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamamura in view of Fiber Article as applied to claims 1-6 above, and further in view of Imao et al (US 4704328).

Hamamura in view of Fiber Article teach all the features of these claims except that the metal is steel and the adhesive promoter is polyvinyl acetate, and that the adhesive promoter is a releasable agent. Fiber Article teaches that a conventional resin substrate is a fiber reinforce plastic composite. See page 668.

Imao teaches a method for applying high melting point material onto a substrate by thermal spraying. Column 2, lines 10-20. The substrate can have a distortion temperature below the melting temperature of the thermal spray material (note the confusion as described in paragraph 10 above as to what is actually required). Column 3, lines 35-60. A substrate is provided with a contour of desired shape. See column 3, lines 60-65. The substrate can be a resin or fiber reinforced resin composite. See column 3, lines 40-60. An adhesive promoter layer is applied to the substrate. Column 3, line 60 through column 4, line 20. The thermal

spray material is applied to the adhesive promoter layer by thermal spraying. Column 4, lines 10-30. The adhesive promoter can be epoxy, polyvinyl acetate or a urethane. See column 3, lines 5-15. The thickness of the promoter can be 100 microns, for example, approximately 0.004 inches. See column 10, lines 10-20.

It is the Examiner's position that steel is a well known conventional material to be thermally sprayed onto various articles. If applicant disagrees, he should so state on the record.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Hamamura in view of Fiber Article to use polyvinyl acetate as the adhesion promoter as suggested by Imao so as to provide an undamaged <sup>and desirable</sup> article, because Hamamura in view of Fiber Article teaches applying coatings by thermal spraying to an adhesion layer of a resin substrate and that the adhesion layer can be a vinyl resin and Imao teaches that when applying coatings by thermal spraying to an adhesion/bonding layer of a fiber reinforced plastic composite, a desirable vinyl adhesion material is polyvinyl acetate. It further would have been obvious to modify the references to use steel as the thermal spray material with an expectation of forming an article of desirable properties, because Hamamura teaches that the metal to be sprayed can be "any commonly employed metal" (see column 6, lines 1-10) and a commonly employed metal is steel. The polyvinyl acetate forms a "releasable agent" as claimed, since it is merely required for the material to be polyvinyl acetate to meet the claimed requirements of a "releasable agent".

16. Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamamura in view of Fiber Article as applied to claims 1-6 above, and further in view of Swingler et al (US 3144349) (also known as Teague et al – See PTO 892).

Hamamura in view of Fiber Article teach all the features of these claims except that the intermediate bonding layer and its thickness and material.

However, Swingler teaches applying a resin containing adhesive layer to a substrate. Column 2, lines 20-45. Then a metal bonding layer is applied by thermal spraying to the resin layer. Column 2, lines 20-45 and column 3, lines 25-40 (the intermediate layer 16). Then a further layer is applied over the bonding layer, where the further layer can be another metal, also applied by thermal spraying. Column 2, lines 40-60 and column 3, lines 35-40 (layer 18). The intermediate layer can be made of aluminum. Column 3, lines 25-35. The resin layer can be 0.002-0.008 inches thick. Column 3, lines 5-10. The top layer 18 can be 0.010-0.025 inches thick. Column 3, lines 35-40.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Hamamura in view of Fiber Article to use an intermediate metal bond layer of a material such as aluminum as suggested by Swingler so as to provide an desirable article, because Hamamura in view of Fiber Article teaches applying coatings by thermal spraying to an adhesion layer of a resin substrate and Fiber Article teaches using multiple bonding layers and Swingler teaches that when applying coatings by thermal spraying to an adhesion/bonding layer of resin it is desirable to apply an intermediate metal bonding layer, followed by a top metal layer. It further would have been obvious to modify the references to optimize the thickness of the bond coat

within the claimed range, because while Swingler does not teach the precise bond coat thickness, the thicknesses of the other layers are taught, and would suggest thicknesses for the bond coat.

17. Claim 17 rejected under 35 U.S.C. 103(a) as being unpatentable over Hamamura in view of Fiber Article and Imao as applied to claims 7-9, 15-16 and 18-20 above, and further in view of Swingler et al (US 3144349) (also known as Teague et al – see PTO 892).

Hamamura in view of Fiber Article and Imao teach all the features of these claims except that the intermediate bonding layer.

However, Swingler teaches applying a resin containing adhesive layer to a substrate. Column 2, lines 20-45. Then a metal bonding layer is applied by thermal spraying to the resin layer. Column 2, lines 20-45 and column 3, lines 25-40 (the intermediate layer 16). Then a further layer is applied over the bonding layer, where the further layer can be another metal, also applied by thermal spraying. Column 2, lines 40-60 and column 3, lines 35-40 (layer 18). The intermediate layer can be made of aluminum. Column 3, lines 25-35. The resin layer can be 0.002-0.008 inches thick. Column 3, lines 5-10. The top layer 18 can be 0.010-0.025 inches thick. Column 3, lines 35-40.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Hamamura in view of Fiber Article and Imao to use an intermediate metal bond layer of a material such as aluminum as suggested by Swingler so as to provide an desirable article, because Hamamura in view of Fiber Article teaches applying coatings by thermal spraying to an adhesion layer of a resin substrate and Fiber Article teaches using multiple bonding layers

and Swingler teaches that when applying coatings by thermal spraying to an adhesion/bonding layer of resin it is desirable to apply an intermediate metal bonding layer, followed by a top metal layer.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:30-4:00) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P. Beck can be reached on (571) 272-1415. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



KATHERINE BAREFORD  
PRIMARY EXAMINER